

April 18, 1961

D. F. ARMOUR

2,980,342

LIQUID SPRAY DISPENSER

Filed Sept. 5, 1957

FIG. 1

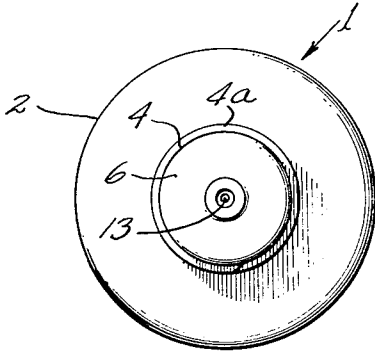


FIG. 3

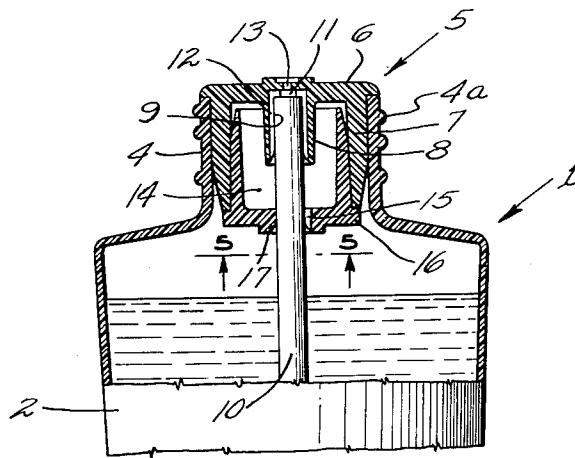


FIG. 2

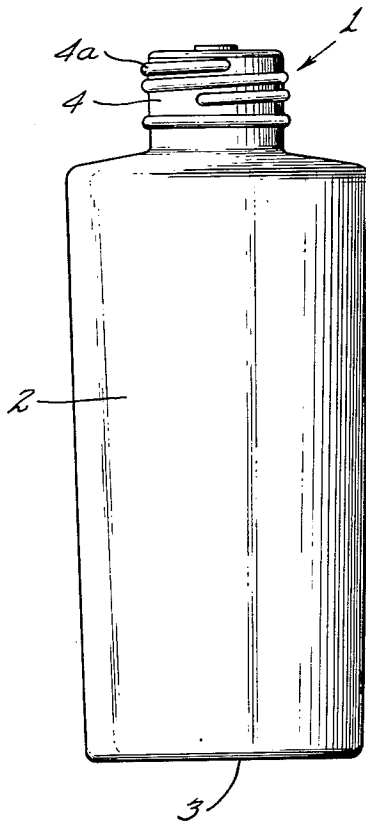


FIG. 4

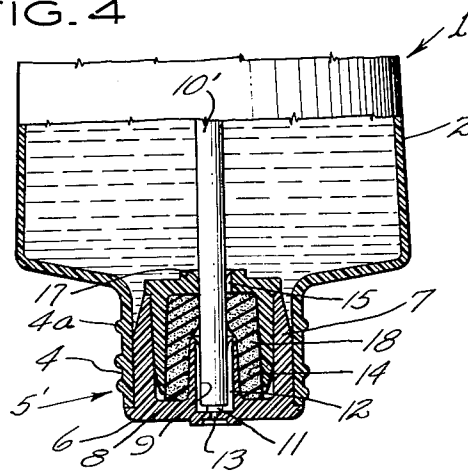
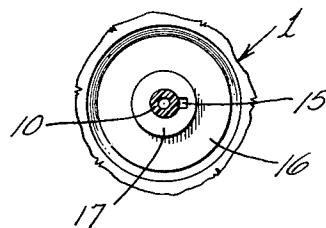


FIG. 5



INVENTOR
DONALD F. ARMOUR

BY *Bates & Willard*
ATTORNEYS

1

2,980,342

LIQUID SPRAY DISPENSER

Donald F. Armour, Bloomfield, Conn., assignor to Plax Corporation, Bloomfield, Conn., a corporation of Delaware

Filed Sept. 5, 1957, Ser. No. 682,132

2 Claims. (Cl. 239—327)

This invention relates to dispensing containers and, more particularly, to those which may be manually collapsible and from which liquid contents may be discharged as an atomizer spray or vapor while the dispenser is held in either an upright or an inverted position, according to the preference of the user.

Heretofore, atomizing or spray dispensers have been provided which produce a satisfactory spray or vapor discharged in an upright position.

Atomizers embodying the present invention have the advantage over such containers of providing an excellent spray discharge in an upside-down as well as an upright position.

A primary object of the invention is to provide a dispenser of the character indicated which is simple and economical to manufacture and is superior to comparable dispensers heretofore available.

Other objects of the invention and advantages thereof will be apparent from the following description of preferred embodiments of the invention and from the accompanying drawings thereof, in which:

Fig. 1 is a plan view of a dispenser embodying the invention;

Fig. 2 is an elevation view of the dispenser shown in Fig. 1;

Fig. 3 is a slightly enlarged vertical cross-section view of the upper portion of the dispenser shown in Fig. 2;

Fig. 4 is a view similar to Fig. 3 of a modified embodiment in which the dispenser is shown inverted and containing a sponge; and

Fig. 5 is a cross-sectional view taken on line 5—5 of Fig. 3.

Referring to the drawings, the container generally designated 1 is shown as comprising a side wall 2, bottom wall 3, and neck 4. While the container 1 may have any of a wide variety of shapes, it is here illustrated as a conventional bottle, the neck 4 of which may have threads 4a, or other means, with which to secure a cap or other closure (not shown) on the neck 4 to seal the bottle.

The illustrated container 1, in accordance with the invention, is molded or otherwise fabricated of a resilient plastic material, as for example polyethylene, and is what is customarily referred to as a plastic squeeze bottle.

In accordance with the invention, the container 1 serves both as a package receptacle for a wide variety of liquid preparations and also serves as a squeezable bulb with which to produce manually the necessary internal fluid pressure for discharging liquid from the container as an atomized mist or spray.

Preferably the bottom 3 and neck 4 of the bottle are relatively thick and shape-retaining, whereas the side wall 2 may be a lesser thickness and readily collapsed merely by manually gripping and squeezing without substantial distorting of the bottom 3 and neck 4.

In accordance with the invention, a discharge nozzle,

2

generally designated 5, is removably secured by a fluid-tight press fit in the neck 4 of the bottle.

In the embodiments shown, the discharge nozzle 5 is a generally cylindrical fitment having a circular disc portion 6 and a depending outer cylindrical sleeve or flange 7 which is press-fit into the neck 4 of the bottle. Concentrically disposed within the sleeve 7 is an inner generally cylindrical depending sleeve 8 having an irregularly shaped passage 9 which frictionally supports the upper end of a tube 10.

The cross section of the passage 9 may take any of a variety of shapes as long as the passage supports the tube 10 in a manner such that the mixing chamber portion 11 at the top of the passage communicates with the interior of the bottle through the bore of the tube 10 and through one or more channels 12 between the outside of the tube and the inner wall of the passage 9. A discharge orifice 13 extends through the top of the discharge nozzle 5 from the mixing chamber 11.

In accordance with the present invention, the annular chamber 14 within the discharge nozzle 5 communicates with the interior of the body of the container through a limiting or throttling passage 15. Annular chamber 14 thus forms an intermediate chamber between mixing chamber 11 and the chamber interiorly of the container.

More particularly, in the embodiment illustrated in the drawings, a smaller cup-shaped back plug member 16 is press-fitted within the annular cylindrical flange 7 of the discharge nozzle 5. Except for the small passage 15 therebetween the tube 10 extends snugly through an opening in the bottom wall 17 of the member 16 to the bottom 3 of the container. The restricting passage 15 in the back plug member 16 thus provides limited clearance for fluid to be forced into the plug chamber 14 from the interior of the container 1 under pressure.

In operation, when the dispenser is squeezed in an upright position, the increased internal pressure created by the squeeze pressure acts to force liquid up through the tube 10 into the mixing chamber 11 where it is mixed with air which is forced up through passage 15, chamber 14 and channels 12 and exhausted as a spray out through the discharge orifice 13.

When similar manual pressure is exerted while the container is in an inverted position, the liquid content is forced downward through the passage 15, chamber 14 and channel 12 into the mixing chamber 11 where it is entrained in air which enters the chamber 11 through the tube 10 and is discharged as a spray through the orifice 13.

The embodiment shown in Fig. 4 differs from that of Fig. 3 in that a sponge 18 is disposed in the chamber 14. The sponge 18, which may be made of cellulose or the like, throttles the liquid so that no dripping or spilling is prevalent when the contents are sprayed from the inverted dispenser. Spray discharge is effected from the upright container 1 in the same manner after the sponge 18 has first been charged with liquid by inverting the dispenser, as illustrated in Fig. 4.

In the embodiment of the invention illustrated in Fig. 4, the length of the tube 10' preferably is approximately half the height of the container and the liquid to be dispensed within the container should not occupy more than 40% of the capacity of the container.

In the preferred embodiments of the invention, the bore of the tube 10, the passage 15, and the channels 12 are so proportioned that liquid and air are discharged from the orifice 13 in substantially the same proportions from the upright and from the inverted positions.

Having thus described illustrative embodiments of the invention, I claim:

1. A liquid atomizer for dispensing an atomized spray of liquid in upright or inverted positions of the atomizer comprising a flexible container for a supply of liquid to

3

be atomized, a discharge nozzle at the upper end of said container, said discharge nozzle having a discharge orifice at its upper end, a mixing chamber in said discharge nozzle communicating with and positioned adjacent said discharge orifice, a tube communicating with and extending from said mixing chamber to the interior of said container, an intermediate chamber in said nozzle surrounding said tube, means forming a passageway from the interior of said intermediate chamber to said mixing chamber, said intermediate chamber having wall means separating it from the liquid supply in said container, and a liquid throttling passage in said wall means to connect the interior of said container with the interior of said intermediate chamber to restrict rate of flow of liquid from said container to said intermediate chamber in the inverted position of said container to thereby provide an atomized spray of liquid when said container is squeezed while in such inverted position which spray is similar to

4

the atomized spray obtained when said container is squeezed while in upright position.

2. A liquid atomizer as recited in claim 1 wherein a liquid retaining sponge is disposed in said intermediate chamber.

References Cited in the file of this patent

UNITED STATES PATENTS

644,703	Buckley -----	Mar. 6, 1900
2,531,745	Schopmeyer -----	Nov. 28, 1950
2,564,400	Hall -----	Aug. 14, 1951
2,642,313	Montenier -----	June 16, 1953

FOREIGN PATENTS

57,888	France -----	Apr. 29, 1953
148,897	Australia -----	Nov. 5, 1952
778,768	Great Britain -----	July 10, 1957